ORDER NO. SD7912-1646

Service Manual

Direct Drive Automatic Turntable System

SL-Q33

(XA), (XG), (E)

SL-Q33K

(XG)

- The model SL-Q33 (XA) is available in Asia, Latin America, Middle East and Africa only.
- The model SL-Q33 (XG) and SL-Q33K (XG) are available in European only.
- The model SL-Q33 (E) is available in Scandinavia only.
- SL-Q33 is of silver finish.
- SL-Q33K is of black finish.

SPECIFICATIONS (Specifications are subject to change without notice.)

General

Power supply:	~ 110-120/220–240V, AC 50 or 60 Hz
Power consumption:	13 W
Dimensions: (W x H x D)	43.0 x 13.0 x 37.5 cm (16-59/64" x 5-7/64" x 14-49/64")
Weight:	7.3 kg (16.06 lb.)

Turntable section

Type:	Quartz direct drive Automatic turntable Auto start, Auto return, Auto stop, Repeat play
Drive method:	Direct drive
Motor:	Brushless DC motor
Turntable platter:	Aluminum die-cast Diameter 31.2 cm (12-9/32")
Turntable speeds:	33-1/3 rpm and 45 rpm
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)

* This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter. Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	–56 dB (IEC 98A Unweighted) –78 dB (IEC 98A Weighted)

Tonearm section

Type:	Universal tone arm
Effective length:	230 mm (9-1/16")
Overhang:	15 mm (19/32")
Effective mass:	12 g (without cartridge)
Tracking error angle:	Within 2°32' at the outer groove of 30 cm (12") record Within 0°32' at the inner groove of 30 cm (12") record
Offset angle:	22°
Friction:	Less than 7 mg (lateral, vertical)
Stylus pressure adjustment range:	0 – 2.5 g
Applicable cartridge weight range:	6 – 9.5 g 13.5 – 17 g (including headshell)
(with shell weight):	3 – 6.5 g 10.5 – 14 g (including headshell)
Headshell weight:	7.5 g

Cartridge section

Type:	Moving magnet
Frequency response:	20 Hz to 25 kHz 20 Hz to 15 kHz ±2 dB
Output voltage:	3 mV at 1 kHz 5 cm/s. zero to peak lateral velocity [4.2mV at 1 kHz 5 cm/s. zero to peak 45° velocity (DIN 45 500)]
Channel separation:	25 dB at 1 kHz
Channel balance:	Within 2 dB at 1 kHz
Compliance (dynamic):	10×10^{-6} cm/dyne at 100 Hz
Stylus pressure:	1.75 ±0.25 g (17.5 ±2.5 mN)
Load impedance:	47 kΩ to 100 kΩ
Weight:	5.6 g (cartridge only)
Replacement stylus:	EPS-207ED (Elliptical stylus)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

TECHNISCHE DATEN (Änderungen der technischen Daten vorbehalten.)

Allgemeine Daten

Stromversorgung:	~ 110-120/220-240V, 50/60 Hz Wechselstrom
Leistungsaufnahme:	13 W
Abmessungen (B x H x T):	43,0 x 13,0 x 37,5 cm
Gewicht:	7,3 kg

Plattenspieler

Typ:	Quarz-Direktantrieb Automatischer Quarz-Direktantrieb-Plattenspieler Startautomatik Rückführautomatik Stoppautomatik Wiederhol-Betrieb
Antrieb:	Direktantrieb
Motor:	Kollektorloser Gleichstrommotor
Plattenteller:	Aluminium-Spritzguß Durchmesser 31,2cm
Plattenteller-Drehzahlen:	33-1/3 und 45 U/min
Gleichlaufschwankungen:	0,012 WRMS* 0,025% WRMS (JIS C5521) ±0,035% Spitze (IEC 98A bewertet)

* Diese Nennleistung bezieht sich auf das Laufwerk-Bauteil allein, ausschließlich Einflüssen von Schallplatte, Tonabnehmer oder Tonarm, aber einschließlich Plattenteller. Gemessen anhand von Signalen vom eingebauten Frequenzgenerator des Motorbauteils.

Rumpel-Geräusch-spannungsabstand:	–56 dB (IEC 98A unbewertet)
Rumpel-Fremd-spannungsabstand	–78 dB (IEC 98A bewertet)

Tonarm

Typ:	Universal-Tonarm
Effektive Länge:	230 mm
Überhang:	15 mm
Effektive Masse:	12 g (ohne Tonabnehmer)
Spurfehlwinkel:	Innérhalb 2°32' bei der Einlaufrille einer 30 cm-Platte Innérhalb 0°32' bei der Auslaufrille einer 30 cm-Platte
Kröpfungswinkel:	22°
Lagerreibung:	Weniger als 7 mg (horizontal, vertikal)
Auflagekraft-Einstellbereich:	0-2,5g
Zulässiger Tonabnehmer-Gewichtbereich:	6 – 9.5 g 13,5-17 g (einschließlich Tonarmkopf)
(mit Zusatzgewicht)	10,5 – 14 g (einschließlich Tonarmkopf)
Tonarmkopf-Gewicht:	7,5 g

Tonabnehmer

Typ:	Magnetischer Tonabnehmer
Frequenzgang:	20 Hz bis 25 kHz 20 Hz bis 15 kHz ± 2 dB
Ausgangsspannung:	3 mV bei 1 kHz 5 cm/s. Null-zu-Spitze, lateral [4,2 mV bis 1 kHz 5 cm/s. Nullzu-Spitze, 45° (DIN 45500)]
Kanaltrennung:	25 dB bei 1 kHz
Kanalabweichung:	Innerhalb 2 dB bei 1 kHz
Nachgiebigkeit (dynamisch):	10 x 10^{-6} cm/dyn bei 100 Hz
Auflagekraft:	1,75 ±0,25 g (17,5 ±2,5 mN)
Impedanz:	47 kΩ bis 100 kΩ
Gewicht:	5,6 g (ohne Tonarmkopf)
Ersatznadel:	EPS-207ED (Elliptische Nadel)

SPECIFICATIONS (Les spécifications sont susceptibles d'être modifiées sans préavis.)

Généralités

Alimentation:	Alternatif 110-120/220-240V, 50 ou 60 Hz
Consommation:	13 W
Dimensions (L x H x P)	43,0 x 13,0 x 37,5 cm
Poids:	7,3 kg

Platine de lecture

Type:	Entraînement direct à quarz Platine automatique Démarrage automatique Retour automatique Arrêt automatique Audition répétée
Système d'entrainement:	Entraînement direct
Moteur:	Moteur C.C. sans balai
Plateau de lecture:	Aluminium moulé sous pression Diamètre 31,2 cm
Vitesses de rotation:	33-1/3 et 45 t/p.m
Pleurage et scintillement:	0,012% WRMS* 0,025% de valeur efficace (JIS C5521) ±0,035% de crête (IEC 98A Pondéré)

* Ce régime nominal se rapporte à l'ensemble du tournedisque seul, excluant les effets du disque, de la cellule pick-up ou du bras de lecture, mais comprenant le plateau. Mesuré par l'obtention d'un signal provenant du générateur de fréquences incorporé de l'ensemble du moteur.

Ronflement:	–56 dB (IEC 98A Non pondéré) –78 dB (IEC 98A Pondéré)

Bras de lecture

Type:	Bras de lecture universel
Longueur effective:	230 mm
Porte-à-faux:	15 mm
Masse réelle:	12 g (sans la cellule pick-up)
Angle d'erreur de piste:	En decà de 2°32' au sillon extérieur d'un disque de 30 cm En decà de 0°32' au sillon intérieur d'un disque de 30 cm
Angle de décalage:	22°
Frottement:	Moins de 7 mg (latéral et vertical)
Plage de réglage de la pression d'appui:	0-2,5 g
Gamme du poids de la cellule pick-up utilisable:	6-9,5 g 13,5-17 g (y compris la coque porte-cellule)
(avec contrepoids de la cellule)	3-6,5 g 10,5-14 g (y compris la coque porte-cellule)
Poids de la cellule:	7,5 g

Cellule pick-up

Type:	Aimant mobile
Réponse en fréquence:	20 Hz à 25 kHz 20 Hz à 15 kHz ±2dB
Tension de sortie:	3 mV à 1 kHz, 5 cm/s. zéro à vitesse latérale de crête (4,2 mV à 1 kHz 5 cm/s., zéro à vitesse 45° de crête [DIN 45 500])
Séparation de canal:	25 dB à 1 kHz
Equilibrage des canaux:	En decà de 2 dB à 1 kHz
Elasticité (dynamique):	10 x 10^{-6} cm/dyne à 100 Hz
Pression de la pointe de lecture:	1,75 ± 0,25 gramme (17,5 ± 2,5 mN)
Impédance de charge:	47 kΩ to 100 kΩ
Poids:	5,6 grammes (cellule seule)
Pointe de lecture de remplacement:	EPS-207ED (Forme elliptique)

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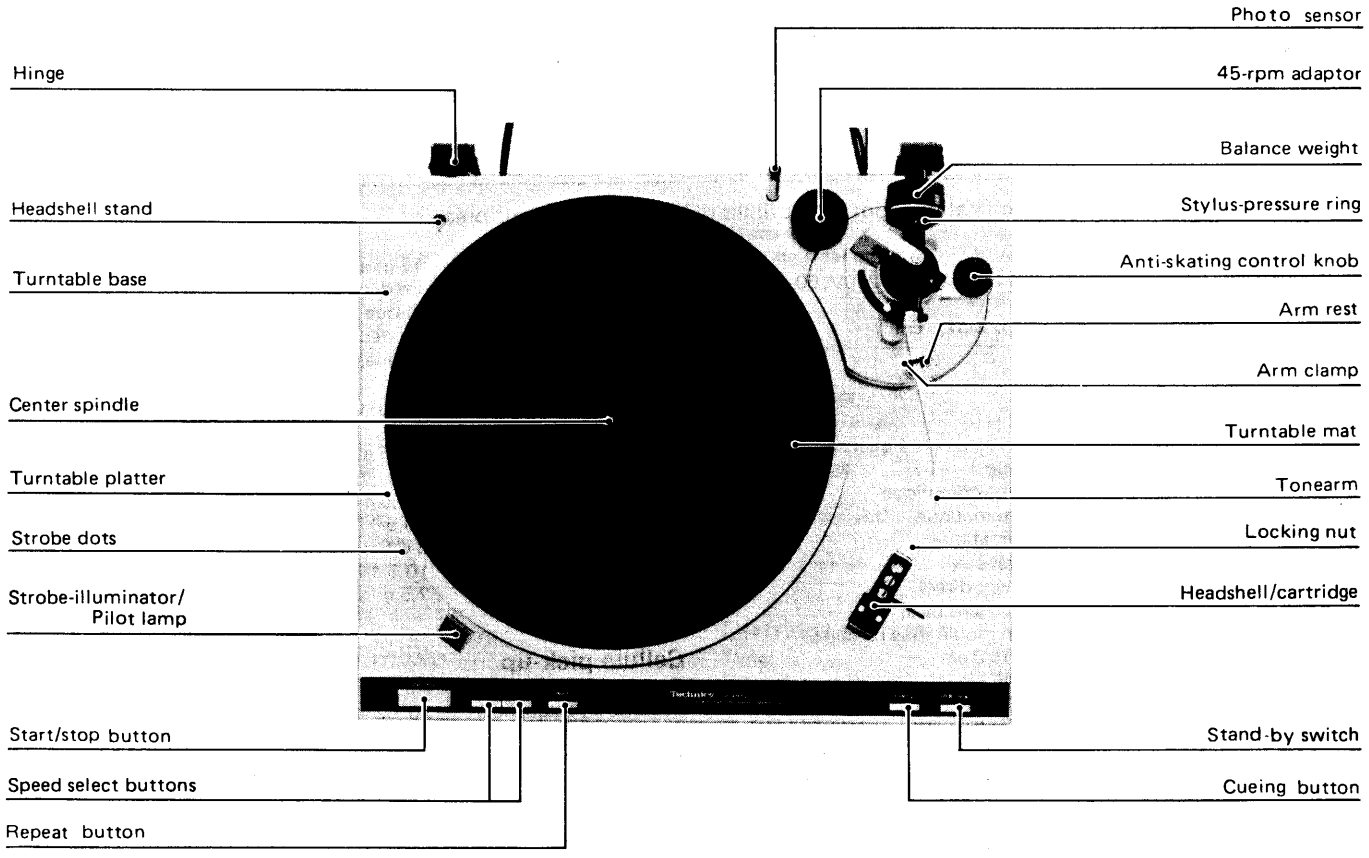
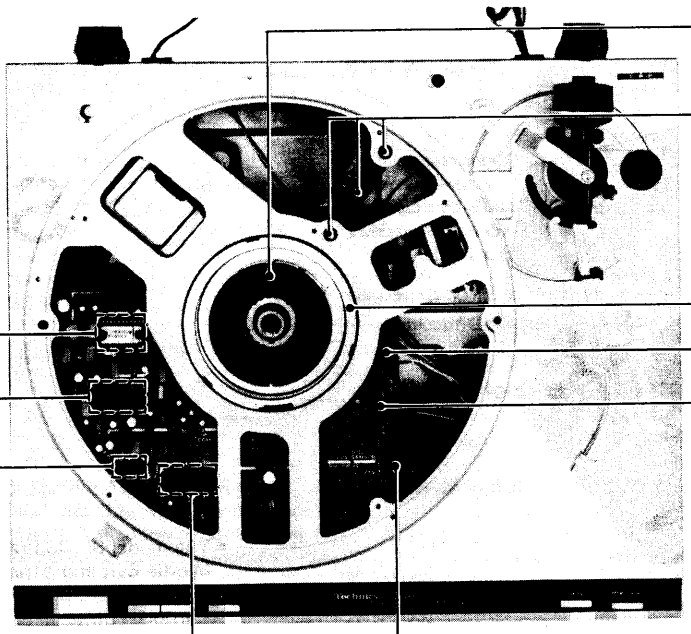
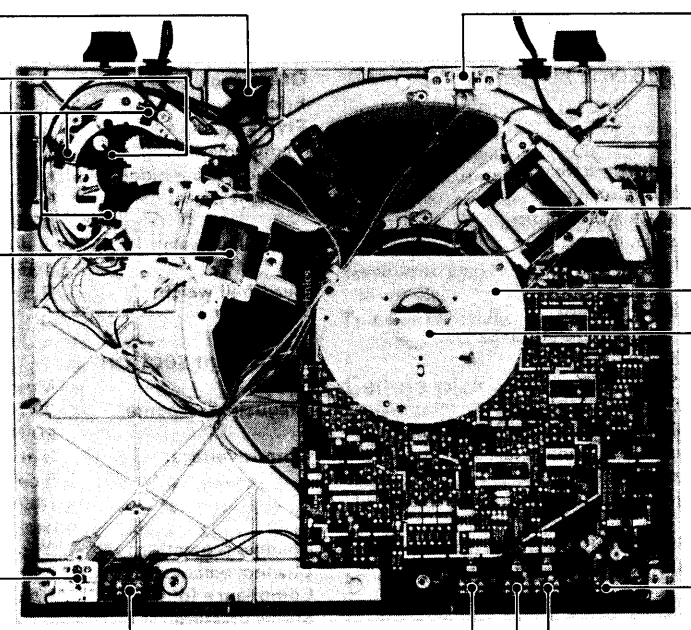
■ LOCATION OF CONTROLS



■ LOCATION OF CONTROLS

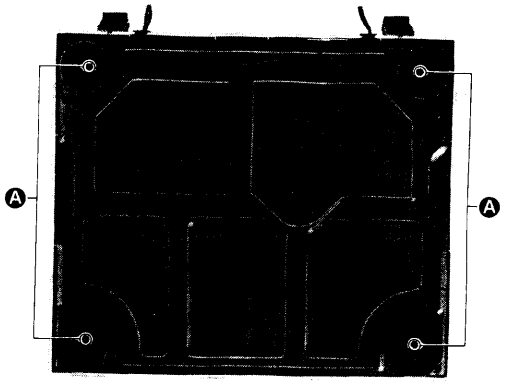




■ DISASSEMBLY PROCEDURE

How to remove bottom base ass'y (See photo 1).

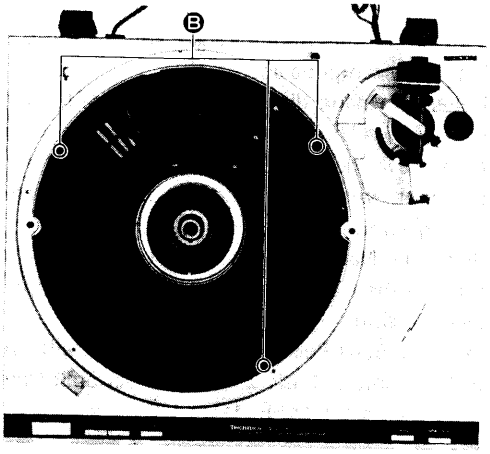
1. Clamp tone arm to the arm rest.
2. Remove head shell and turntable platter.
3. Close dust cover.
4. Turn unit upside down taking special care not to damage or scrach the dust cover.
5. Remove 4 screws Ⓐ of the audio insulator.



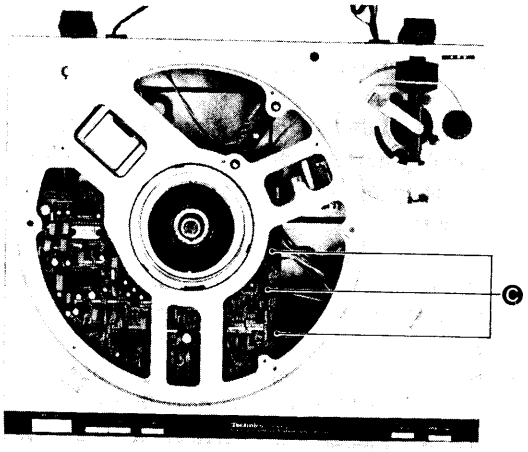
[Photo 1]

How to remove drive circuit p.c.b. and stater frame coil

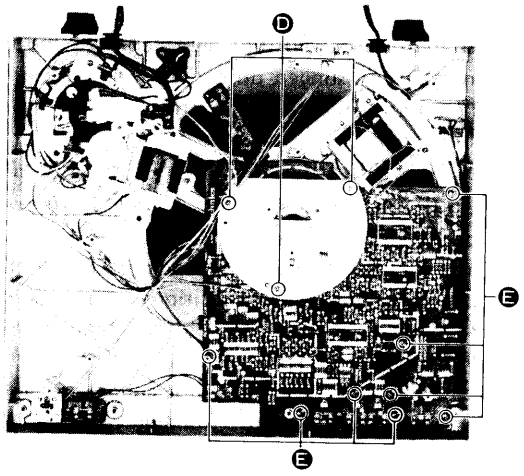
1. Remove dust cover.
2. Remove 3 screws Ⓑ of the panel cover as shown in Photo 2.
3. Remove 3 connectors Ⓒ as shown in Photo 3.
4. Remove 8 screws Ⓔ of the drive circuit p.c.b. and 3 screws Ⓓ of the stater base as shown in Photo 4.
5. Remove 3 screws Ⓕ of the stater frame cover as shown in Photo 5.
6. Disconnect 3 soldered parts Ⓖ of the stater frame coil and 3 screws Ⓗ of the stater frame coil as shown in Photo 6.
7. Disconnect 1 soldered part Ⓘ of the F.G detector coil and 3 solderd parts Ⓙ of the F.G detector coil as shown in Photo 6.



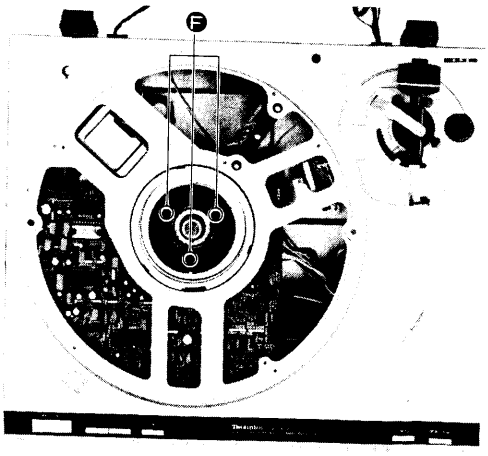
[Photo 2]



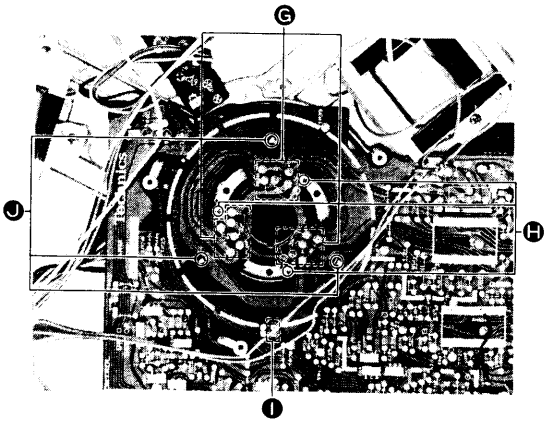
[Photo 3]



[Photo 4]



[Photo 5]



[Photo 6]

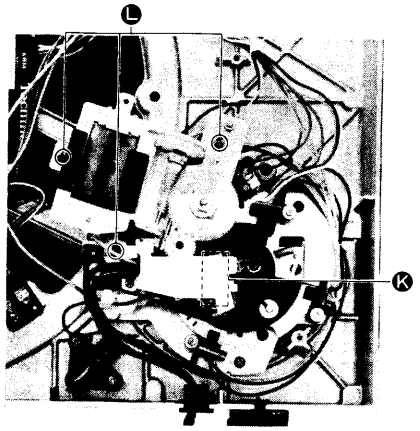
How to remove tone arm drive mechanism and tone arm

1. Disconnect soldered of the phono cord Ⓚ and 3 screws Ⓛ of the arm drive motor plate as shown in Photo 7.
2. Remove 1 screw Ⓜ of the tone arm fixing plate and spring Ⓝ of the anti-skate force control as shown in Photo 8.

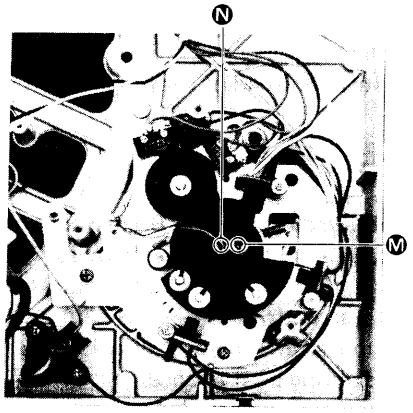
[Note]

Don't touch screw Ⓟ, because muting time is adjusted.

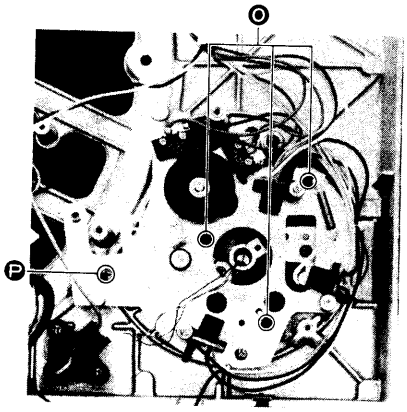
3. Remove 3 screws Ⓞ of the movable base assembly as shown in Photo 9.
4. Remove 2 screws Ⓠ of the tone arm, then the tone arm can be replaced.
5. Remove 2 screws Ⓠ of the tone arm and 1 screw Ⓡ of the arm base, then the arm base can be replaced. **(See Photo 10)**



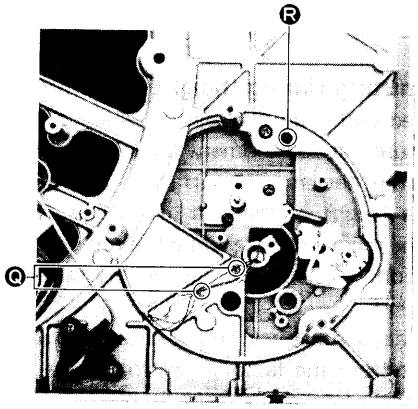
[Photo 7]



[Photo 8]



[Photo 9]



[Photo 10]

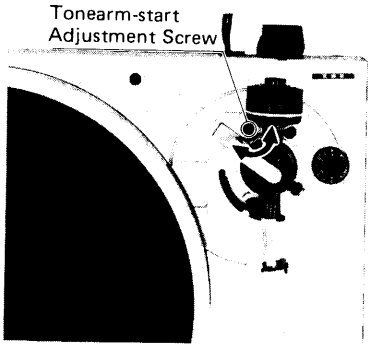
■ ADJUSTMENTS

Adjustment for automatic start position (See Photos 11, 12)

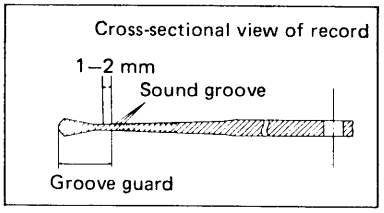
Auto-start position (where the stylus tip lowers onto the record surface during automatic play mode) should be adjusted with a record on the turntable platter.

If the tip of the stylus does not land at a proper location on the record it should be adjusted in the following manner. Be sure to use a 30 cm record for adjusting the auto-start position.

1. Clamp the tonearm to the arm rest.
2. Take the rubber cap off the auto-start position adjustment screw.
   Then turn the adjustment screw clockwise or counterclockwise with a screwdriver.
3. If the stylus tip descends onto the sound grooves, the adjustment screw must be turned clockwise.
4. If the stylus tip descends outside the record the adjustment screw must be turned counterclockwise.
5. The auto-start position must be adjusted so that the tip of the stylus descends 1 to 2 mm from the lead-in groove. **(Fig. 1)**



[Photo 11]



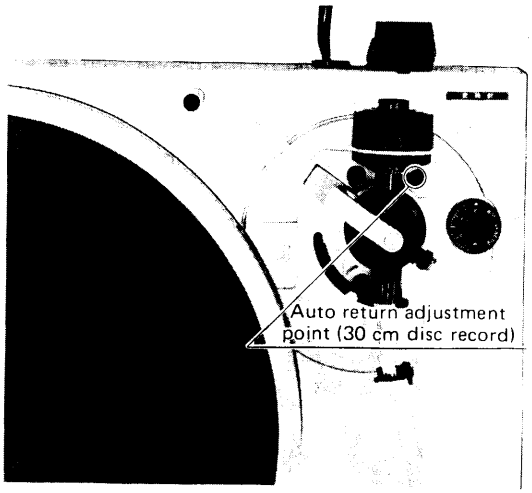
[Fig. 1]

Adjustment for automatic return position

[Note]

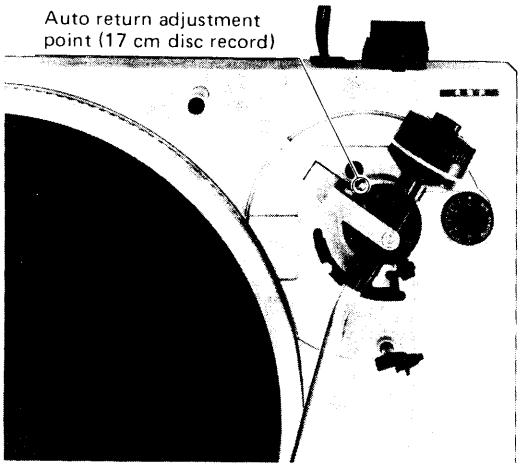
Adjust the position according to the following procedure with respect to 17cm and 30cm records.

- **Automatic return adjustment of 30 cm disc**
  1. Fix the tone arm on the rest. **(See Photo 12)**
  2. Remove the rubber cap of the 30 cm record automatic return position adjusting screw, and then turn the screw with a screwdriver,
     . . . . .Turn the screw counterclockwise when the tone arm returns during performance.
     . . . . .Turn the screw clockwise when the tone arm does not return after the end of performance.



[Photo 12]

- **Automatic return adjustment of 17 cm disc**
  1. Shift the tone arm inside. **(See Photo 13)**
  2. Turn the 17 cm record automatic return position adjusting screw with a screwdriver.
     . . . . .Turn the screw counterclockwise when the tone arm returns during performance.
     . . . . .Turn the screw clockwise when the tone arm does not return after the end of performance.



[Photo 13]

Adjustment of muting timing (height of arm lift)

This unit is fitted with a muting feature which is used to cut off irritating noise caused at the moment the stylus is brought down on or lifted up from the record surface. Muting timing can be adjusted by the height of the arm lift, a clearance between the stylus tip and the record surface while the top of the tone arm is at the "**UP**" position (▼), by depressing the cueing button. **(See Photo 14).**

The height of the arm lift was adjusted to a range of 5 ~ 10 mm before shipment from the factory. Perfom the adjustment in the following manner when adjustment is needed for the cartridge being used.

- To begin with, protect the tip of the stylus with the stylus protecter.
- Push the stand-by switch to the ⏻ position (■) so that the turntable does not move.
- The top of the adjustment screw is hexagonal. While holding the arm lift down, turn the adjustment screw.

Remember to depress the arm lift when turning the adjustment screw.

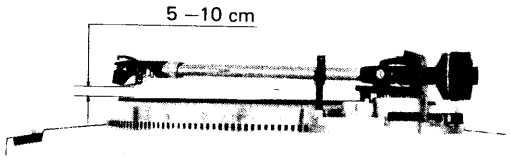
If recorded sound cannot be reproduced at once after the stylus was lowered onto the record surface, try to adjust the timing by turning the adjustment screw counterclockwise, and thus increasing the distance between the stylus tip and the record surface.

In case irritating noise is generated when the stylus is lowered onto the record surface, decrease the distance by turning the adjustment screw clockwise.

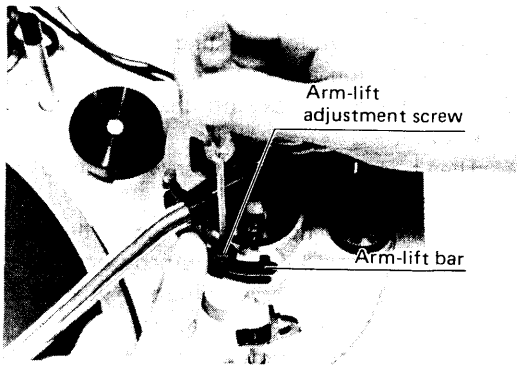
[Note]

As the adjusting screw has a hexagonal head be sure to make the adjustment while depressing the arm lift or the screw will not move freely (See photo 16)

Also be sure that the hexagonal head retracts correctly into the arm lift when the latter is released.



[Photo 14]



[Photo 15]

JUSTIERUNGEN

Justierung der automatischen Start-Position (Abb. 11, 12)

Die Auto-Start-Position (wo die Nadelspitze beim automatischen Betrieb auf die Schallplattenoberfläche aufsetzt) sollte justiert werden, wenn eine Schallplatte auf dem Plattenteller aufliegt.

Wenn die Nadelspitze nicht auf der richtigen Stelle auf der Platte landet, sollte die Position wie folgt justiert werden. Verwenden Sie unbedingt eine 30 cm-Platte für die Einstellung der Auto-Start-Position.

1. Befestigen Sie den Tonarm mit der Arretierklammer auf der Tonarmablage.
2. Nehmen Sie die Gummikappe von der Auto-Start-Position-Justierschraube ab.
   Drehen Sie dann die Justierschraube mit einem Schraubenzieher im Uhrzeiger-oder Gegenuhrzeigersinn.
3. Wenn die Nadelspitze auf den Wiedergabeteil der Platte abgesenkt wird, drehen Sie die Justierschraube im Uhrzeigersinn.
4. Wenn die Nadelspitze außerhalb der Platte abgesenkt wird, drehen Sie die Justierschrabue entgegen dem Uhrzeigersinn.
5. Die Auto-Start-Position muß so eingestellt weden, daß die Nadelspitze 1 bis 2 mm von der äußersten Tonrille entfernt aufsetzt. **(Abb. 1)**

Adjustierung der automatischen Rückkehrposition

Anmerkung:

Adjustieren Sie dei Position in Übereinstimmung mit den folgenden Anweisungen unter Berücksichtigung der Größe von 17 cm und 30 cm Schallplatten.

Auto-Rückführeinstellung für 30 cm Schallplatten

1. Befestigen Sie den Tonarm auf dem Tonarmrest. **(Siehe Abb.12)**
2. Entfernen Sie die Gummikappe der Einstellschraube der automatischen Rückkehrposition für 30 cm Schallplatten, und drehen Sie diese Einstellschraube mit einem Schraubenzieher.

* Drehen Sie die Einstellschraube entgegen dem Uhrzeigersinn, wenn der Tonarm während des Abspielens einer Schallplatte vorzeitig zurückkehrt.

* Drehen Sie die Einstellschraube im Uhrzeigersinn, wenn der Tonarm nach Beedigung des Abspielvorgangs nicht zur Ausgangsposition zurückkehrt.

Auto-Rückführeinstellung für 17 cm Schallplatten

1. Schieben Sie den Tonarm nach innen. **(Siehe Abb. 13)**
2. Drehen Sie die Einstellschrabue der automatischen Rückfüreinstellung für 17 cm Shcallplatten mit einem Schraubenzieher.

* Drehen Sie die Einstellschraube entgegen dem Uhrziegersinn, wenn der Tonarm während des Abspielens einer Schallplatte vorzeitig zurückkehrt.

* Drehen Sie die Einstellschraube im Uhrzeigersinn, wenn der Tonarm nach Beedigung des Abspielvorgangs nicht zur Ausgangsposition zurückkehrt.

Justierung der Dämpfungszeit (Tonarmlifthöhe) (Abb. 14)

Dieses Gerät ist mit einer Dämpfungsvorrichtung ausgestattet, welche die störenden Geräusche beim Absenken oder Abheben der Nadelspitze ausscheidet.

Die Dämpfungszeit kann durch Regulieren der Tonarmlifthöhe justiert weden, indem die Lifttaste gedrückt wird. Die Tonarmlifthöhe ist der Abstand zwischen Nadelspitze und Schallplattenoberfläche, wenn der Tonarm in der angehobenen Position (▼) ist.

Die Tonarmlifthöhe ist vor der Auslieferung im Werk auf einen Bereich von 5 ~10 mm eingestellt worden.**(Abb. 19.)**

Wenn für den zu verwendenden Tonabnehmer eine Justierung erforderlich ist, nehmen Sie diese auf folgende Weise vor.

- Setzen Sie zuerst den Nadelschutz auf.
- Schalten Sie den Ein/Aus-Schalter aus (■), damit sich der Plattenteller nicht drehen kann.
- Die Justierschraube hat einen Sechskantkopf.Drehen Sie die Justierschraube, währenddem Sie die Tonarmlift-führung niedergedrückt halten.

Damit sich die Schraube leicht drehen läßt, muß die Tonarmliftführung unbedingt neidergedrückt werden.

Falls die Tonwiedergabe nicht sofort nach dem Absenken der Nadel auf die Schallplattenoberfläche beginnt: Verkürzen Sie die Dämpfungszeit durch Drehen der Justierschraube entgegen dem Uhrzeigersinn, wodurch der Abstand zwischen der Nadelspitze und der Plattenoberfläche vergrößert wird.

Falls beim Absenken oder Abheben der Nadel störende Geräusche gehört werden: Verringern Sie den Abstand durch Drehen der Justierschraube im Uhrzeigersinn.

Anmerkung:

Da die Justierschraube einen Sechskantkopf hat, muß die Tonarmliftführung während des Justierens unbedingt gedrückt gehalten werden, damit sich die Schraube leicht drehen läßt.

Vergewissen Sie sich, daß der Sechskantkopf in die Tonarmliftführung zurückkehrt, wenn diese losgelassen wird.

■ REGLAGES

Réglage pour une position de démarrage automatique (Fig. 11, 12)

La position d'auto-démarrage (lorsque l'extrémité de la pointe de lecture s'abaisse sur la surface du disque pendant le mode d'audition automatique) devra être mise au point avec un disque placé suf le plateau de l'électrophone.

Si l'extrémité de la pointe de lecture ne descends pas à l'endroit approprié du disque, elle devra être réglée de la façon suivante. S'assurer tout d'abord d'utiliser un disque de 30 cm pour la mise au point de la position d'atuo-démarrage.

1. Bloquer le bras de lecture sur l'accoudoir du bras.
2. Retirer le capuchon en caoutchouc de la vis de réglage de positionnement d'auto-démarrage.
   Puis, avec un tournevis, tourner la vis de réglage dans le sens des aiguilles d'une montre ou dans le sens inverse.
3. Si l'extrémité de la pointe de lecture descends sur les sillons du disque, la vis de réglage devra être tournée dans le sens des aiguilles d'une montre.
4. Si l'extrémité de la pointe de lecture descends en dehors du dique, la vis de réglage devra être tournée dans le sens inverse des aiguilles d'une montre.
5. La position d'auto-démarrage devra être mise au point de façon à ce que l'extrémité de la pointe de lecture descende à 1 ou 2 mm à partir du sillon du départ. **(Fig. 1)**

Réglage de la position de retranchement automatique

Note:

Régler la position en respectant le procédé suivant, en fonction des diques de 17 et 30 cm.

Réglage du retranchement automatique du disque de 30 cm.

1. Fixer le bras acoustique sur son appui. **(Voir la photographie 12).**
2. Déposer le capuchon de caoutchouc de la vis de réglage de la position de retranchement automatique du disque de 30 cm et tourner la vis à l'aide d'un tournevis.
   - Tourner la vis à gauche quand le bras acoustique revient pendant la lecture.
   - Tourner la vis à droite quand le bras acoustique ne revient pas après la fin de la lecture.

Réglage du retranchement automatique du disque de 17 cm.

1. Porter le bras acoustique vers l'intérieur. **(Voir la photographie. 13)**
2. Tourner la vis de réglage de la position de retranchement automatique du disque de 17 cm, à l'aide d'un tournevis.
   - Tourner la vis à gauche quand le bras acoustique revient pendant la lecture.
   - Tourner la vis à droite quand le bras acoustique ne revient pas après la fin de la lecture.

Mise au point de la synchronisation d'accord silencieux (hauteur du souleveur du bras).

(Figs. 14)

Cet appareil est équipé d'un dispositif d'accord silencieux qui est utilisé pour couper les bruits irritants causés au moment où la pointe de lecture s'abaisse sur ou se soulève de la surface du disque.

La synchronisation d'accord silencieux peut être mise au point par la hauteur du souleveur du bras, l'intervalle entre l'extrémité de la pointe de lecture et la surface du disque alors que le sommet du bras de lecture est à la position **"up"** (▼), en appuyant sur la touche commutatrice de pose et de relevage.

La hauteur du souleveur du bras a été réglée sur une plage de 5 ~ 10 mm avant d'être expédiée de l'usine. **(Fig. 19)**

Exécuter la mise au point de la manière suivante lorsqu'un réglage est nécessaire pour la cellule de lecture utilisée.

- Tour d'abord, protéger l'extrémité de la pointe de lecture avec son capot protecteur.
- Couper l'interrupteur d'alimentation (■), de façon à ce que la platine ne puisse tourner.
- Le dessus de la vis de réglage est hexagonal.
  Tout en maintenant le souleveur de bras vers le bas, tourner la vis de réglage.

Ne pas oublier d'abaisser le souleveur du bras lorsqu'on tourne la vis de réglage.

Si le son enregistré ne peur être reproduit immédiatement aprés que la pointe de lecture s'est abaissée sur la surface du disque: Essayer d'ajuster l'accord silencieux en tournant la vis de réglage dans le sens inverse des aiguilles d'une montre et en augmentant ainsi la distance entre l'extrémité de la pointe de lecture et la surface du disque.

Dans le cas où un bruit irritant se produit lorsque la pointe de lecture est abaissée sur la surface du disque: Diminuer la distance en tournant la vis de réglage dans le sens des aiguilles d'une montre.

Nota:

Comme la vis de réglage possède une tête hexagonale, s'assurer d'effectuer la mise au point tout en abaissant l'élévateur du bras, sinon la vis ne bougera pas librement. Vérifier aussi que la tête hexagonale se retire correctement dans l'élévateur du bras quand ce dernier est libéré.

■ REPLACEMENT PARTS LIST (Electric Parts)

Notes: 1. Part numbers are indicated on most mechanical parts.
Please use this number for parts orders.
2. ⚠ indicates that only parts specified by the manufacture be used for safety.

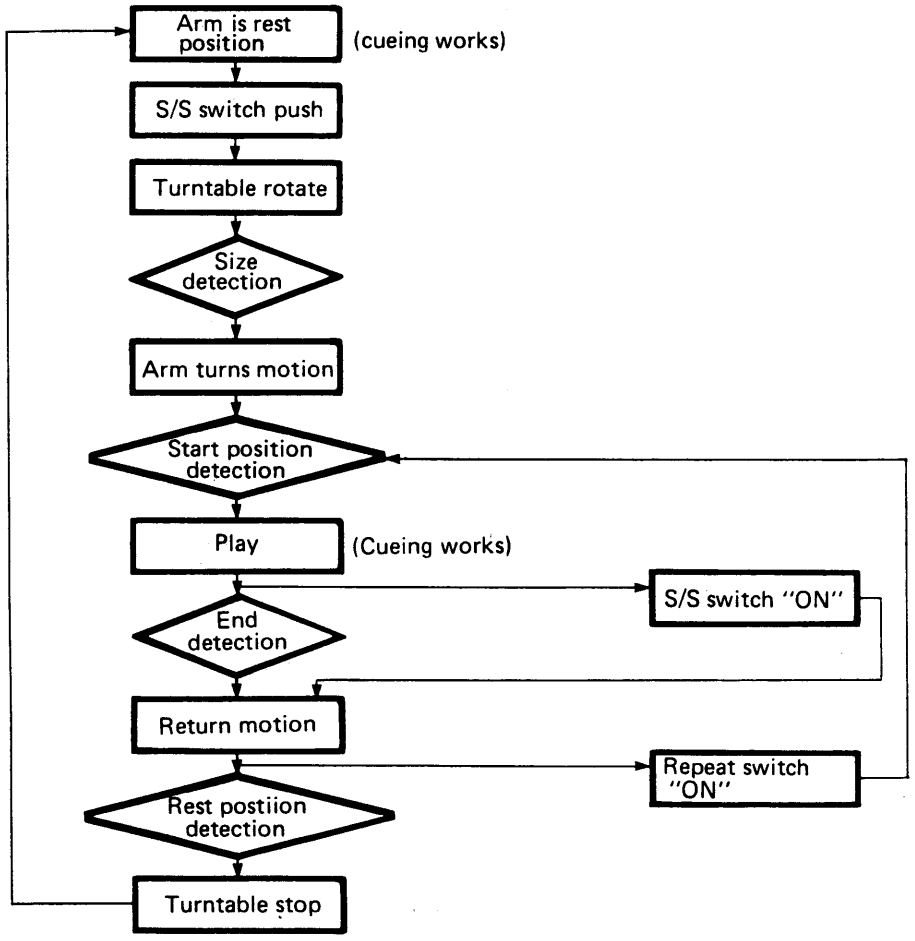
Ref. No.		Part No.	Part Name & Description
IC			
IC1		SVIUPC14312	Integrated Circuit, Regulator
IC2		SVIFS7805C	Integrated Circuit, Regulator
IC101		AN6675	Integrated Circuit, Drive
IC201		AN6680	Integrated Circuit, Drive
IC401		MN1400PA	Integrated Circuit, Micro Computer
IC402		SVIM53217P	Integrated Circuit, Buffer
TRANSISTORS			
Q101		2SB641	Transistor
Q102, 201, 202		2SD636	Transistor
Q203		**2SC1328-T**	Transistor
Q401 ~ 406, 409		2SD636	Transistor
Q407, 408, 410		2SB641	Transistor
Q901, 902		2SD638	Transistor
Q903, 904, 907 ~ 909		2SB643	Transistor
Q905, 906, 910 ~ 914		2SD636	Transistor
PHOTO INTERRUPTERS			
PC501		ON1128	Photo Interrupter
PC502, 503		ON1128SK	Photo Interrupter
DIODES			
D1		SVDS1RBA20Z	Rectifier
D101		**20A90**	Diode, Ge
D201, 202		SVDEBR5505S	Diode, Si
D203, 204, 404		SVDSR105C	Light Emitting Diode
D205, 401~403, 901~906		**MA162A**	Diode, Si
D907~909		SVDGL-520	Light Emitting Diode
CRYSTAL			
X201		SVQU306115	Crystal
POWER TRANSFORMER			
T1		SLT54D1E	Power Transformer
SWITCHES			
S201, 202, 401~403		EVQP5R04K	Switch, Start/Stop, Repeat and Cueing
S501, 502		SFDSD2MSC	Switch, Limit
S601	⚠	ESB6237	Switch, Power
S701		SFDSHSW0665B	Switch, Muting
S801	⚠	SFDSHXW13312	Switch, Power Source
FUSE			
F1	⚠	XBA2C02T IA	Fuse, 200 mA
F2	⚠	XBA2C06 TRO	Fuse, 600 mA
RESISTORS			
R101		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R102		**ERX1ANJ2R7**	Metal Film, 2.7Ω, 1W, ± 5%
R103		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R104		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R105		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R106		**ERD25FJ150**	Carbon, 15Ω, 1/4W, ± 5%
R107		**ERD25FJ562**	Carbon, 5.6kΩ, 1/4W, ± 5%
R108		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R109		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ± 5%
R110		**ERD25FJ222**	Carbon, 2.2kΩ, 1/4W, ± 5%
R201		**ERD25FJ331**	Carbon, 330Ω, 1/4W, ± 5%

Ref. No.		Part No.	Part Name & Description
R202		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ± 5%
R203		**ERD25FJ470**	Carbon, 47Ω, 1/4W, ± 5%
R204		**ERD25TJ154**	Carbon, 150kΩ, 1/4W, ± 5%
R205		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R206		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R207		**ERD25FJ332**	Carbon, 3.3kΩ, 1/4W, ± 5%
R208		**ERD25FJ221**	Carbon, 220Ω, 1/4W, ± 5%
R209		**ERD25FJ471**	Carbon, 470Ω, 1/4W, ± 5%
R210		**ERD25FJ272**	Carbon, 2.7kΩ, 1/4W, ± 5%
R211		**ERD25TJ124**	Carbon, 120kΩ, 1/4W, ± 5%
R212		**ERD25TJ183**	Carbon, 18kΩ, 1/4W, ± 5%
R213		**ERD25TJ563**	Carbon, 56kΩ, 1/4W, ± 5%
R214		**ERD25TJ224**	Carbon, 220kΩ, 1/4W, ± 5%
R215		**ERD25TJ154**	Carbon, 150kΩ, 1/4W, ± 5%
R216		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R217		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R218		**ERD25FJ121**	Carbon, 120Ω, 1/4W, ± 5%
R219		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R220		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R221		**ERD25FJ221**	Carbon, 220Ω, 1/4W, ± 5%
R222		**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R223		**ERD25FJ391**	Carbon 390Ω, 1/4W, ± 5%
R224		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R401		**ERD25FJ181**	Carbon, 180Ω, 1/4W, ± 5%
R402		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R403, 404		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R405, 406		**ERD25FJ222**	Carbon, 2.2kΩ, 1/4W, ± 5%
R407~409		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R410, 411		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ± 5%
R412		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R413		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R414		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R415~417		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R418		**ERD25TJ183**	Carbon, 18kΩ, 1/4W, ± 5%
R419		**ERD25TJ123**	Carbon, 12kΩ, 1/4W, ± 5%
R420, 421		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R422		**ERD25FJ150**	Carbon, 15Ω, 1/4W, ± 5%
R423~427		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R428		**ERD25FJ682**	Carbon, 6.8kΩ, 1/4W, ± 5%
R429		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R430		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R901, 902		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R903, 904		**ERD25FJ471**	Carbon, 470Ω, 1/4W, ± 5%
R905, 906		**ERD25FJ332**	Carbon, 3.3kΩ, 1/4W, ± 5%
R907, 908		**ERD25FJ222**	Carbon, 2.2kΩ, 1/4W, ± 5%
R909, 910		**ERD25FJ332**	Carbon, 3.3kΩ, 1/4W, ± 5%
R911		**ERG1ANJ150**	Metal Oxide, 15Ω, 1W, ± 5%
R912, 913		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R914		**ERG1ANJ150**	Metal Oxide, 15Ω, 1W, ± 5%
R915, 916		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R917		**ERG1ANJ150**	Metal,Oxide, 15Ω, 1W, ± 5%
R918, 919		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R920		**ERD25FJ331**	Carbon, 330Ω, 1/4W, ± 5%
R921		**ERD25FJ101**	Carbon, 100Ω, 1/4W, ± 5%
R922		**ERD25FJ471**	Carbon, 470Ω, 1/4W, ± 5%
R923		**ERD25TJ474**	Carbon, 470kΩ, 1/4W, ± 5%
R924		**ERD25FJ332**	Carbon, 3.3kΩ, 1/4W, ± 5%
R925		**ERD25TJ474**	Carbon, 470kΩ, 1/4W, ± 5%
R926		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R927		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R928		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R929		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R930		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R931, 932		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
CAPACITORS			
C1		ECQM1H153KZ	Polyester, 0.015μF, 50V, ±10%
C2, 3		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80% −20%
C4		**ECEB1HS471**	Electrolytic, 470μF, 50V
C5		**ECEA1CS221**	Electrolytic, 220μF, 16V

Ref. No.		Part No.	Part Name & Description			
C6		**ECEA1AS221**	Electrolytic,	220μF,	50V	
C7		ECQM1H104KZ	Polyester,	0.1μF,	50V,	±10%
C101~103		**ECEA1CS330**	Electrolytic,	33μF,	16V	
C104~107		ECQM1H104KZ	Polyester,	0.1μF,	50V,	±10%
C108		**ECEA1ES101**	Electrolytic,	100μF,	25V	
C109, 110		ECQM1H104KZ	Polyester,	0.1μF,	50V,	±10%
C111		ECQM1H562KZ	Polyester,	0.0056μF,	50V,	±10%
C112		**ECEA25Z4R7**	Electrolytic,	4.7μF,	25V	
C201		**ECEA1CS330**	Electrolytic,	33μF,	16V	
C202		**ECEA50Z1**	Electrolytic,	1μF,	50V	
C203		**ECEA1ES470**	Eelctrolytic,	47μF,	25V	
C204, 205		**ECEA50Z1**	Electrolytic,	1μF,	50V	
C206		ECQM1H473KZ	Polyester,	0.047μF,	50V,	±10%
C207		**ECEA1AS221**	Eelctrolytic,	220μF,	50V	
C208		**ECEA50Z1**	Electrolytic,	1μF, ,	50V	
C209		ECCD1H151K	Ceramic,	150pF,	50V,	±10%
C210		ECCD1H330K	Ceramic,	33pF,	50V,	±10%
C211		ECCD1H471K	Ceramic,	470pF,	50V,	±10%
C212		**ECEA1ES470**	Electrolytic,	47μF,	25V	
C213		ECQM1H224KZ	Polyester,	0.22μF,	50V,	±10%
C214		ECQM1H473KZ	Polyester,	0.047μF,	50V,	±10%
C215		**ECEA50Z3R3**	Electrolytic,	3.3μF,	50V	

Ref. No.		Part No.	Part Name & Description			
C216		**ECEA1AS101**	Electrolytic,	100μF,	10V	
C217		ECKD1H104ZFZ	Ceramic,	0.1μF,	50V,	+80% −20%
C401		**ECEA1CS330**	Electrolytic,	33μF,	16V	
C402		ECKD1H104ZFZ	Ceramic,	0.1μF,	50V,	+80% −20%
C403		ECCD1H101K	Ceramic,	100pF,	50V,	±10%
C404		ECKD1E473ZF	Ceramic,	0.047μF,	25V,	+80% −20%
C405		ECKD1H223ZF	Ceramic,	0.022μF,	50V,	+80% −20%
C406		ECKD1E473ZF	Ceramic,	0.047μF,	25V	+80% −20%
C407		ECQM1H104KZ	Polyester,	0.1μF,	50V,	±10%
C408~412		ECKD1E102K	Ceramic,	0.001μF,	25V,	+80% −20%
C901, 902		ECQM1H103KZ	Polyester,	0.01μF,	50V,	±10%
C903		ECKD1H104ZFZ	Ceramic,	0.1μF	50V,	+80% −20%
C904		**ECEA1CS221**	Electrolytic,	220μF,	16V	
C905		ECKD1H104ZFZ	Ceramic,	0.1μF,	50V,	+80% −20%
C906		ECSF16E10Z	Tantalum,	10μF,	16V,	
C907		ECQM1H102KZ	Polyester,	0.001μF,	50V,	±10%
C908		ECKD1H102KB	Ceramic,	0.001μF,	50V,	+80% −20%
C909		ECQM1H102KZ	Polyester,	0.001μF,	50V,	±10%
C910		**ECEA1HS100**	Electrolytic,	10μF,	50V,	
C911		ECKD1H102KB	Ceramic,	0.001μF,	50V,	+80% −20%
C912~914		ECKD1H104ZFZ	Ceramic,	0.1μF,	50V,	+80% −20%

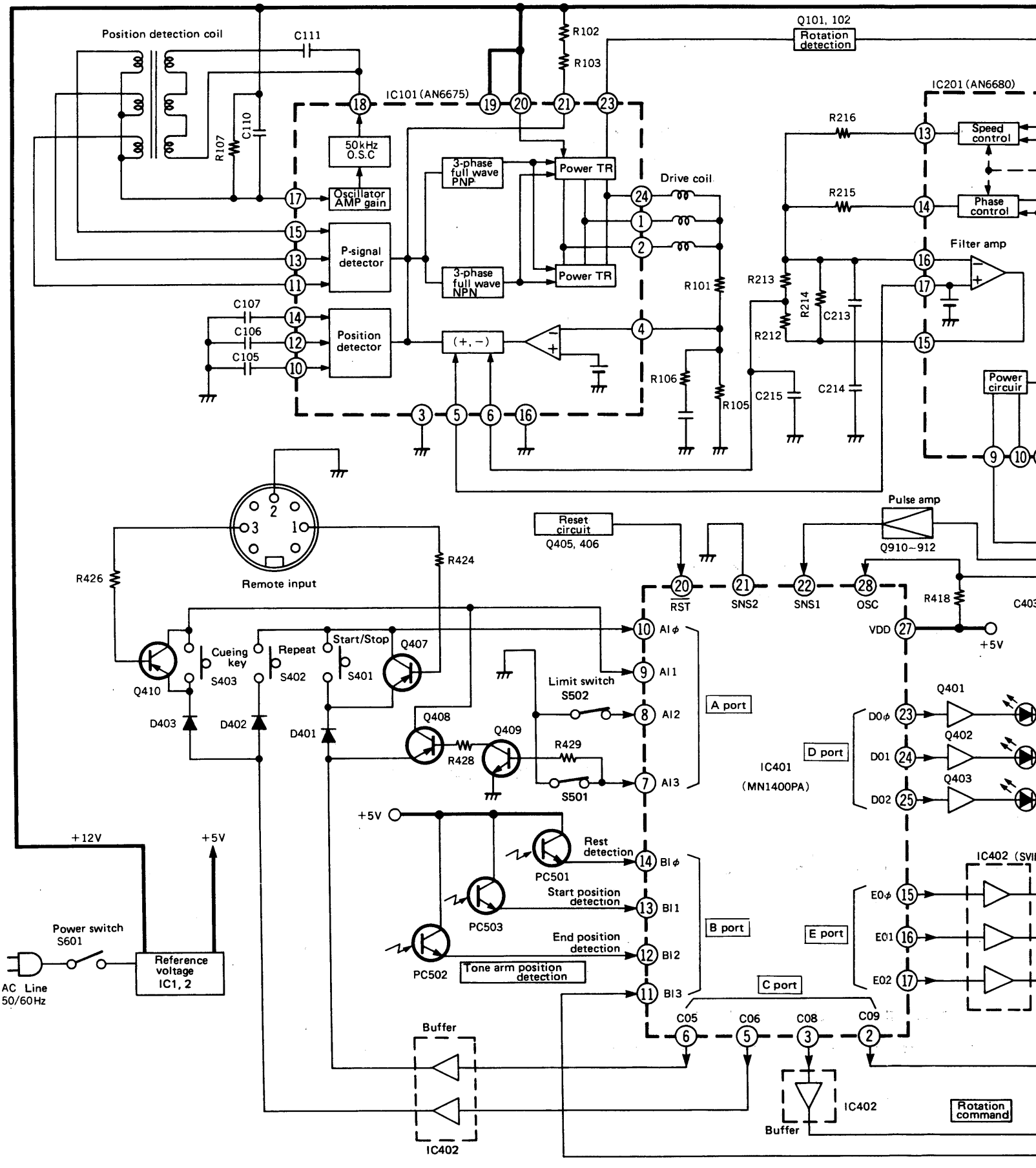
■ FLOW CHART OF AUTO START MOTION

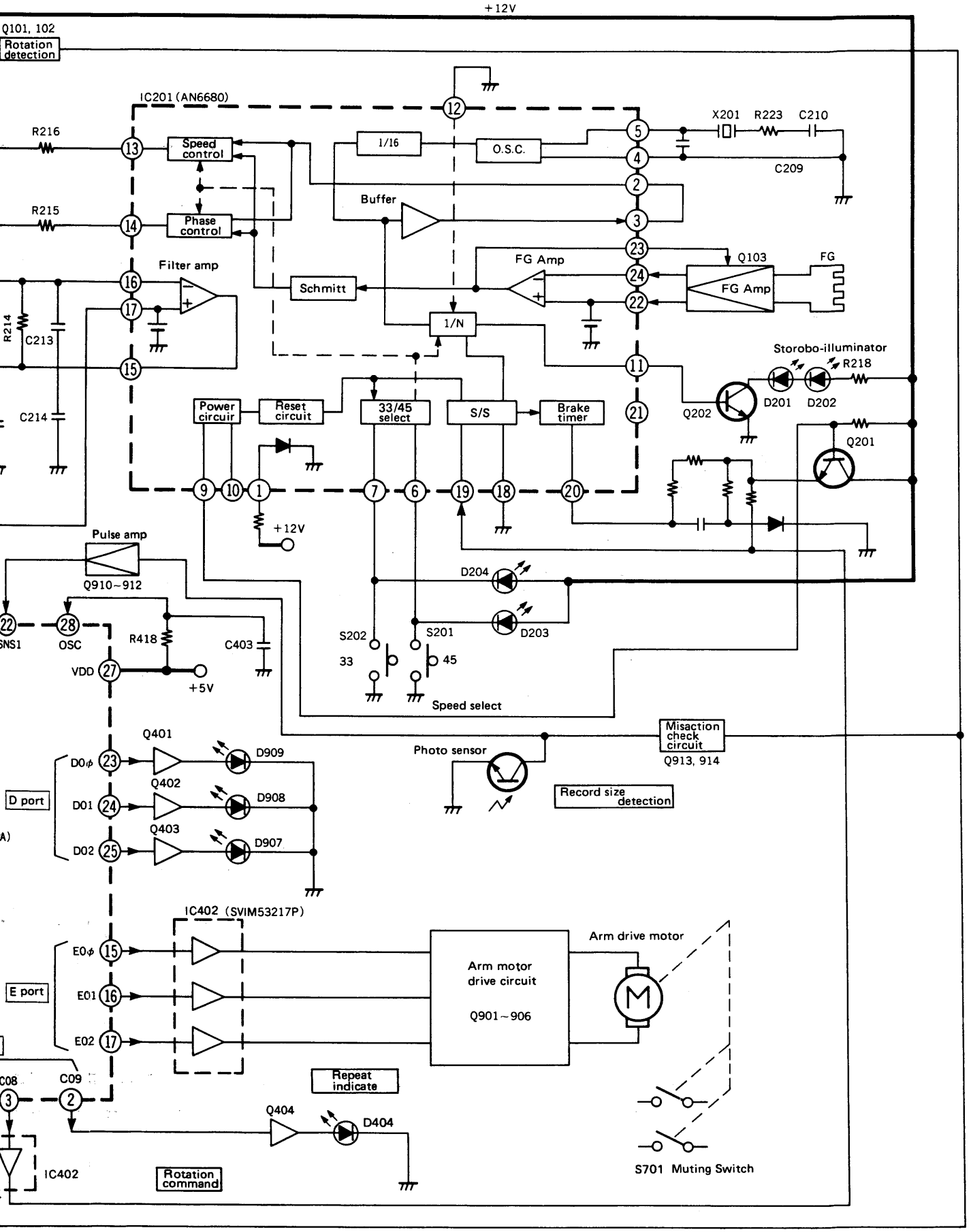


■ MN1400PA

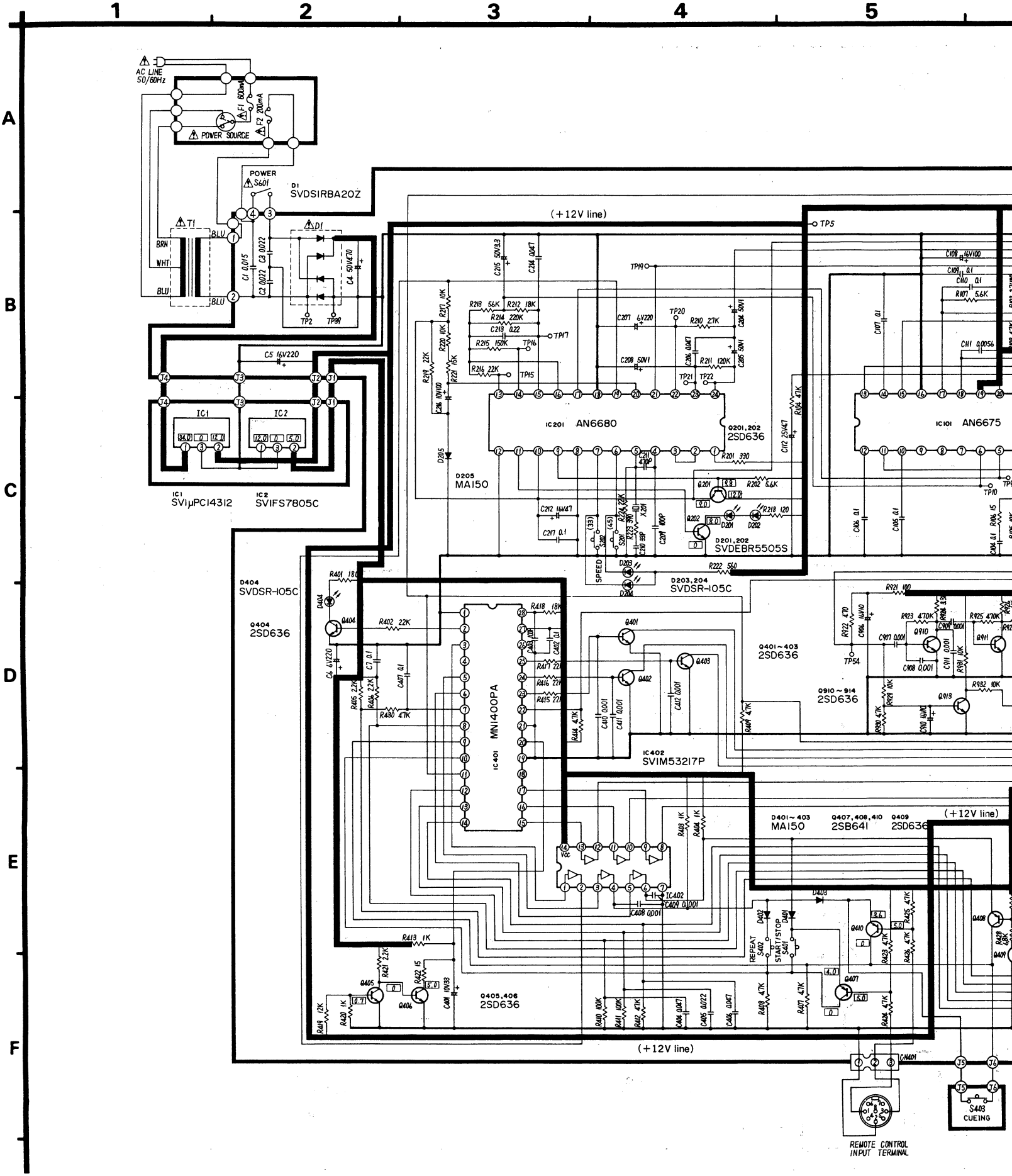
PIN NAMES AND FUNCTIONS OF MN1400			
Pin No.	Symbol	Name	Function
1	Vss	Ground	Reduction to earthing potentiona (Normally 0V)
2	Co9	Repeat	LED lamp switch for repeat indication. "H" level at ON.
3	Co8	Start/Stop	Start-Stop control Signal. "H" level at start.
4	Co7		No provided to this set.
5	Co6	Start/Stop and repeat	For start-stop instructions.
6	Co5	Cueing	When the cueing lever switch is turned to up direction, AI1 and this terminal are shorted.
7	AI3	Limit switch	Both in indicate "H" level at cueing up.
8	AI2	Limit switch	
9	AI1	Cueing	Input terminal for cueing (2 motions).
10	AI0	Start/Stop	Input terminal for start-stop and repeat.
11	BI3	Start detection	The terminal to check if the turntable is in rotation. "H" level during rotation.
12	BI2	End detection	When the pulse for end defection of LP record is give, the level is turned to "H" and the arm return motion follows.
13	BI1	End detection	Like BI2 terminal, end detection of EP record is made by BI2 terminal and this terminal.
14	BI0	Rest	"L" level when the arm is on the rest and "H" level if the arm is out of the rest.
15	Eo0	Motor drive	Instruction is given to the arm and the driven motor (Forward rotation, reverse rotation, low speed, high, speed)
16	Eo1	Motor drive	
17	Eo2	Motor drive	
18	Eo3		Not used for this set.
19	TST	Test	Normally used at "L" level to test the discrete unit of micro computer.
20	$\overline{RST}$	Reset input terminal	Turn this terminal to "L" level, then the micro computer is reset.
21	SNS0	Sensor	This is connected to ground for use.
22	SNS1	Sensor	The input from the photo sensor is given as a pulse.
23	Do0	LED drive	The output terminal to generate the inflared ray, LED
24	Do1	LED drive	
25	Do2	LED drive	
26	Do3		Not used for this set
27	V_{DD}	Power input terminal	V_{DD} voltage is applied. (Standard +5V)
28	OSC	Oscillator input terminal	The combination of a resistor and a capacitor as the terminal to generate clock signal, and the required clock is obtained by the oscillation circuit which contains LSI.

LOCK DIAGRAM



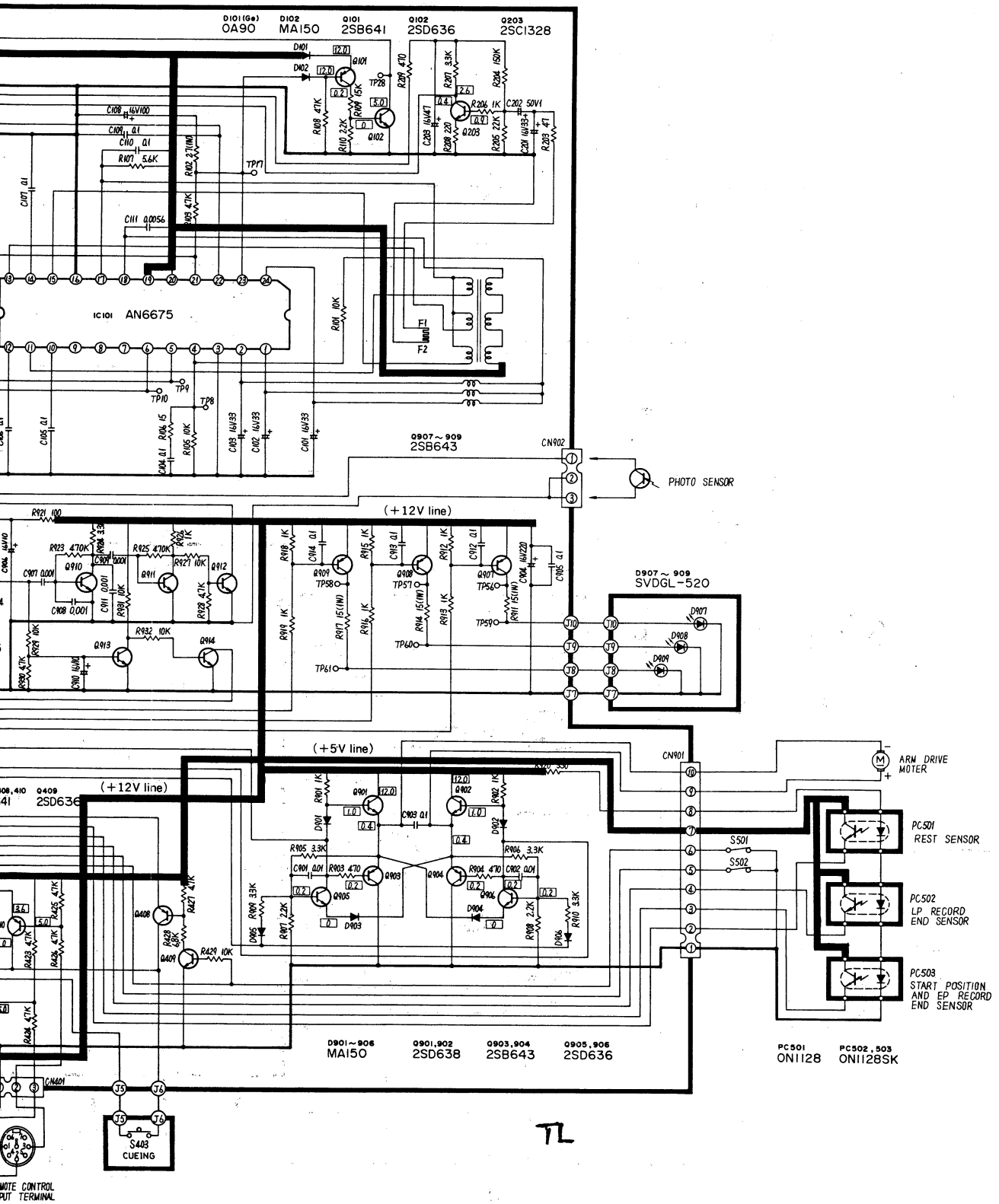

+12V
Q101, 102
Rotation detection
IC201 (AN6680)
R216
R215
R214
C213
C214
Speed control
Phase control
Filter amp
Schmitt
1/16
O.S.C.
X201
R223
C210
C209
Buffer
FG Amp
Q103
FG
1/N
Storobo-illuminator
R218
D201
D202
Q202
Q201
Power circuit
Reset circuit
33/45 select
S/S
Brake timer
+12V
Pulse amp
Q910~912
D204
D203
S202
S201
33
45
Speed select
SNS1
OSC
R418
C403
VDD
+5V
Misaction check circuit
Q913, 914
Photo sensor
Record size detection
Q401
Q402
Q403
D909
D908
D907
D port
D0φ
D01
D02
IC402 (SVIM53217P)
E port
E0φ
E01
E02
Arm motor drive circuit
Q901~906
Arm drive motor
C08
C09
Repeat indicate
Q404
D404
IC402
Rotation command
S701 Muting Switch

■ SCHEMATIC DIAGRAM (This schematic diagram may be modified at any time with the development of new techn



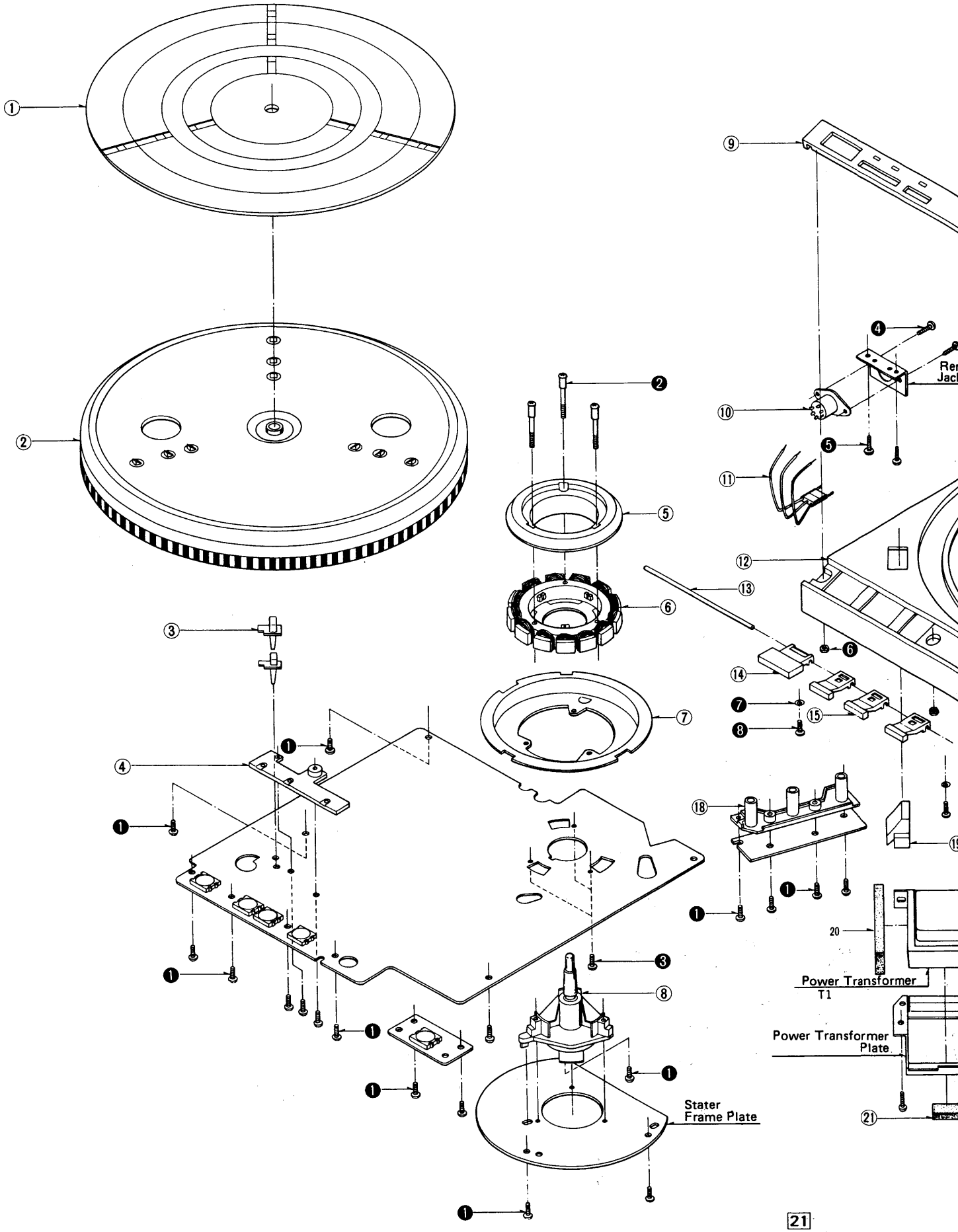
opment of new technology.)

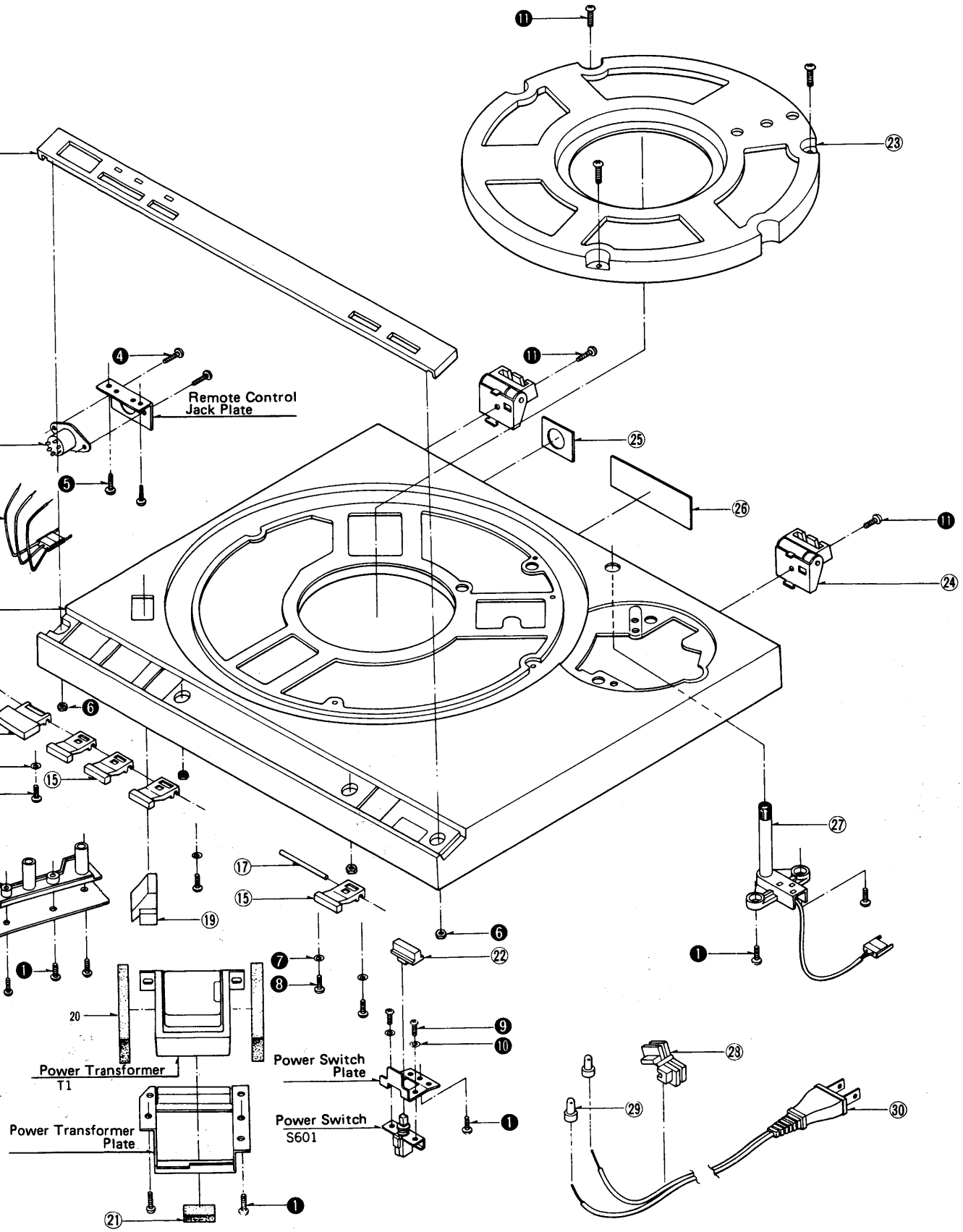
5 6 7 8 9



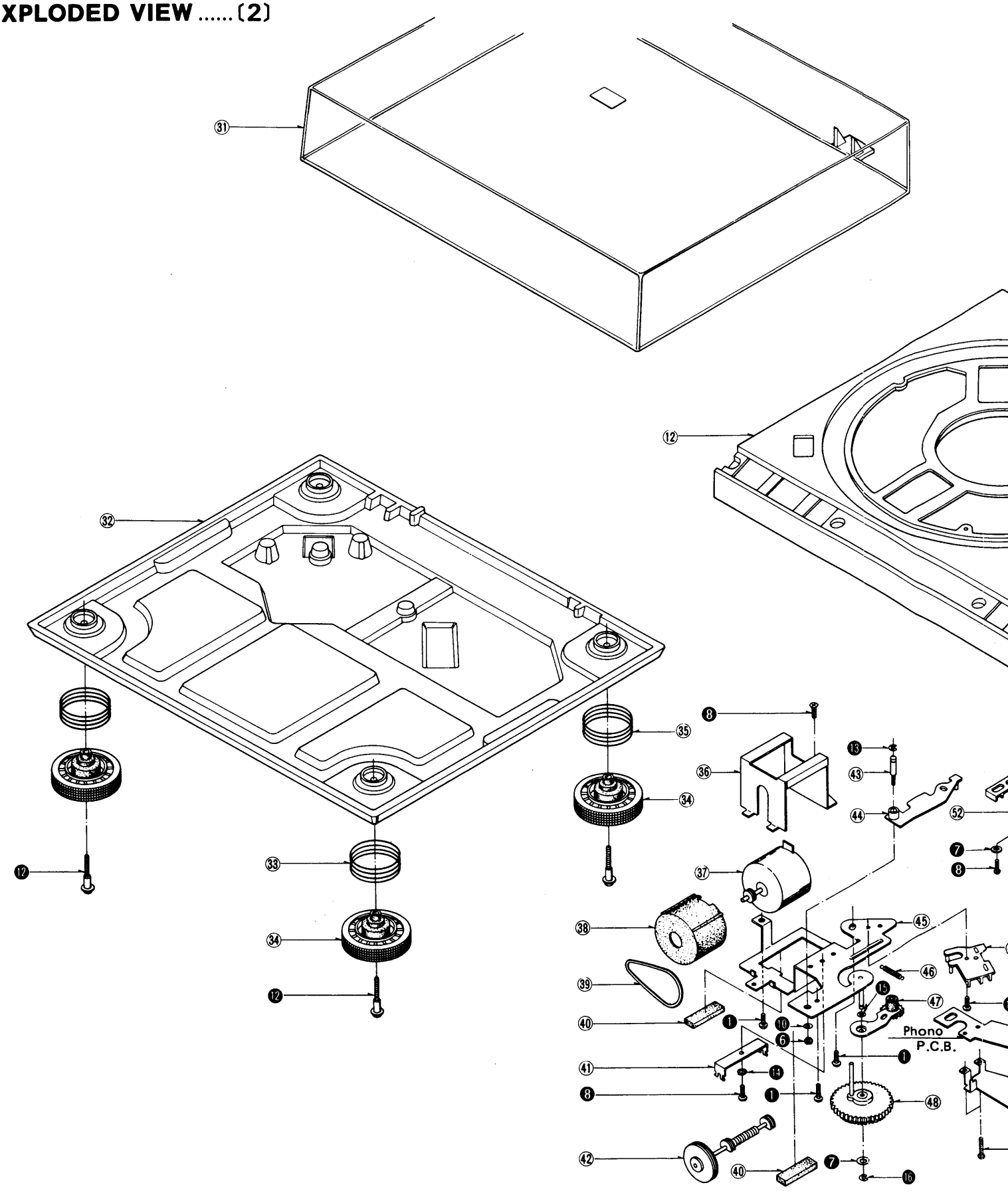
TL

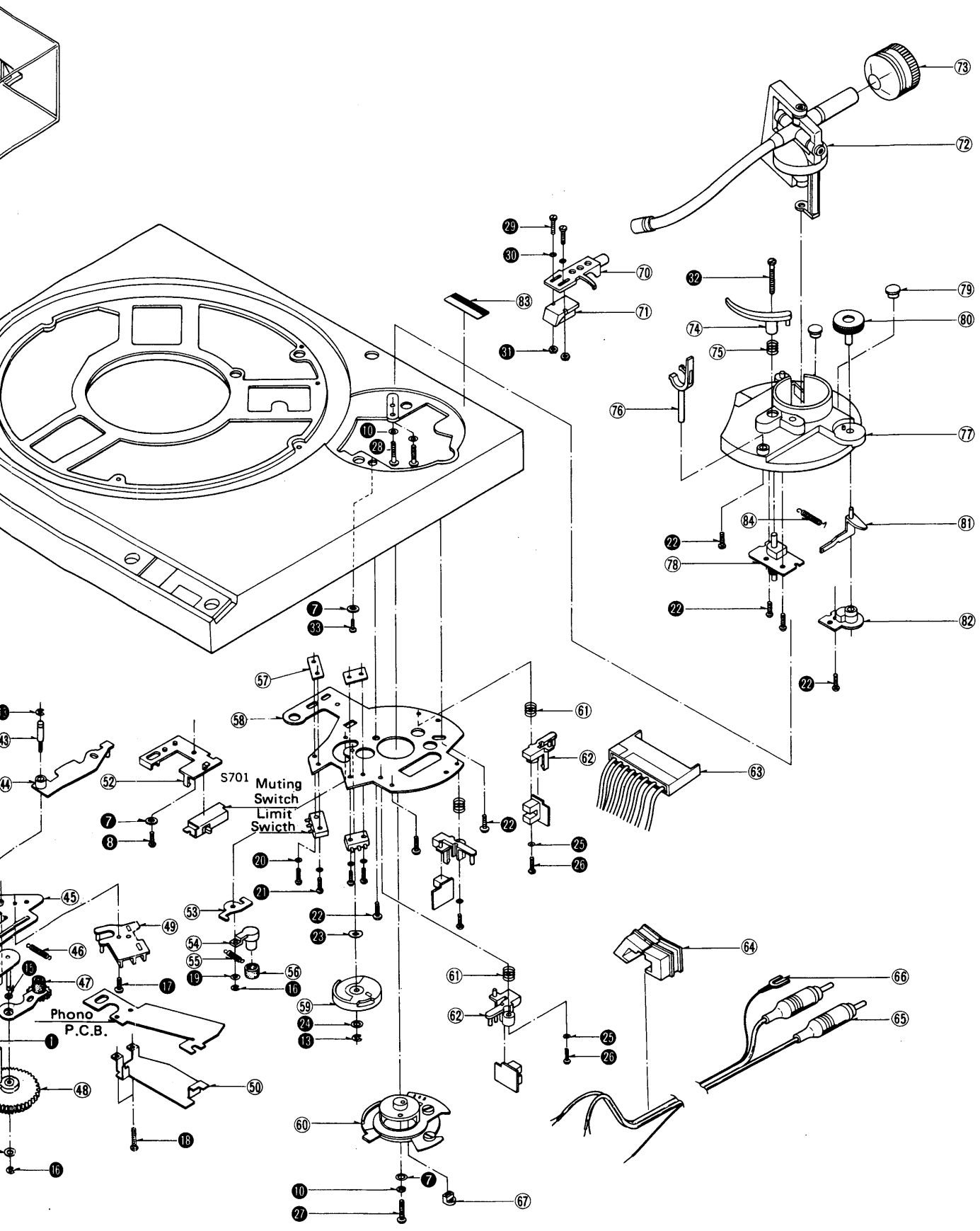
■ EXPLODED VIEW ..... (1)




Remote Control Jack Plate
Power Transformer T1
Power Transformer Plate
Power Switch Plate
Power Switch S601

■ EXPLODED VIEW .....〔2〕





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